



A Society Based Research to Assess Adherence of Antiretroviral Therapy



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Abstract

Access Adherence to Antiretroviral Therapy. A community-based antiretroviral (ART) drugs adherence study was conducted in Kolkata, India beginning in January and concluding in March 2011. This study was designed to explore the level of adherence as well as factors influencing adherence to ART by those who are receiving treatment through a public health care delivery system. This health care system is implemented through the National AIDS Control Program in the state of West Bengal, India. The research findings showed a high degree of non-adherence, between 48-52%, among the ART recipients. The analysis highlights a number of key factors negatively influencing adherence including long waiting time at the ART center, distance from residence to ART Centre, travel related expenditure, and fear of being identified as HIV + to family members and neighbors. Some positive influences were identified in the data as well. If a person is a member of a positive people network there is a greater chance for adherence as well as if an individual self-identifies as positive to others. However, no single factor, rather a combination of several factors, proved to be responsible for influencing ART adherence among recipients.

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1. Introduction

Regular intake of antiretrovirals in scheduled doses is shown to bring down the positive person's 'Viral Load' as well as boost immunity through an increase in the CD4 Count. This helps avert opportunistic diseases and other infections while improving the quality of life for people living with HIV/AIDS (PLHIV). The role of ART is to

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suppress the multiplication of viruses for which regular and continued treatment is essential. ART does not cure the illness but helps the incumbent individual lead a normal life as ART delays the onset of severe illness through the suppression of the virus. Significant reduction of viral load in a patient's circulation makes the individual noninfective. As a result, HIV positive individuals taking ARTs will not be able to transmit the infection to others. This helps with prevention and is commonly known as 'Treatment as Prevention' (TasP). In India, as part of the National Strategy, 'Treatment as Prevention' is considered an important element of the HIV Prevention program. However poor adherence to ART shall not protect the individual from getting opportunistic diseases and other infections. Non-adherence to ART could be a prime reason behind the development of resistant strains. A combination of anti-retroviral drugs is the treatment of choice. To ensure success in ART regimens requires a strong commitment on the part of the patient to continue with the treatment regime.

Non-adherence to ART remains a concern across the world and is recognized as the most important contributing factor behind treatment failure and the development of a resistant strain. To ensure effectiveness, patients need to take the prescribed drugs on time, with proper dosages and scheduling. It is hard to achieve 100% medication adherence, but studies have shown that if adherence level is maintained to the tune of 70% to 90% this could bring about effective outcomes of ART intervention. It has also been demonstrated that a 10% higher level of adherence results in 21% reduction in disease progression provided

'Medication adherence' is good.

There is no substantive information regarding the percentage of treatment failure due to development of a resistant strain in India. ART delivery centers, in general, do not possess laboratory support systems to confirm viral suppression which is often assessed through the clinical progression of the disease. Diagnosis of treatment failure due to a mutated HIV strain often is delayed, the clinician has to rely primarily on the drop of CD4 count and deterioration of overall patient health. There is a high probability of HIV transmission from individuals, who are experiencing treatment failure as the recipients often believe that they are not going to transmit HIV infection through unprotected sex or through other possible means as they are under the treatment regime. However, one of the critical prerequisites for successful ART depends on a high level of adherence by the recipient to the prescribed medicine. In absence of sophisticated laboratory support to assess adherence to ART in the country, this study was designed to measure adherence to ART using a pretested tool to collect the responses from participants.

The objective of the Study In view of the lack of data surrounding ART adherence among those is receiving treatment with antiretroviral medications. The researchers from School of Tropical Medicine jointly with DMSC developed a plan to implement a study on ART adherence among recipients in Kolkata, India. The objectives of this study were to assess adherence to ART among those who are receiving treatment, to identify factors that might affect ARTs' adherence among the recipients categorized under personal, familial, social and structural factors, and also to find out possible mechanisms and approaches that may aid in improving ART adherence.

2. Research Methods

Community through positive peoples' networks in the state of West Bengal. All samples were drawn from ART recipients who are linked to one or other positive networks but not necessarily members of the network. Information was gathered from networks to ensure reach and accessibility of the participants. The researchers decided not to involve 'service providers' of the ART centers or the staff members of the service delivery institutes to avoid any possible 'bias' and to reduce 'social desirability responses' from the participants.

Participants who agreed to take part in the study were taken as part of a valid sample for the proposed study. An Instrument was developed to collect relevant socio-demographic characteristics, health-seeking behaviors including sexual behavior and practices, state of health, knowledge, and awareness on HIV and AIDS including risk perception among PLHIV who are on ART. The questionnaire was pretested among ART recipients before finalization. Information was collected on stigma and discrimination that might have affected their accessibility and utilization of ART services. Data were analyzed to look at plausible relationships between drug adherence and all other socio-structural parameters.

Adherence to ART was recorded as taking medications as prescribed by the physician at the correct time and the correct doses during three time periods: last week, last month and the last six months. Missing of one or more doses during last month is defined as an operational definition of non-adherence to treatment. Interviews were carried out in the field preceded by taking the informed consent, from the participants. All participants were given a full understanding of the importance of the study and their rights not to participate and to withdraw if they decide at any point.

Four positive individuals were recruited as field investigators to carry out the study. After taking informed consent from the individuals, the investigators explained the objective of the study in detail to the interviewees prior to the introduction of the questionnaire. All filled in questionnaires were checked by the field supervisor to identify gaps or inconsistencies in the responses. The data was then entered and analyzed using Epi-info package.

3. Results and Analysis

Socio-economic background

Out of the 113 individuals interviewed, the maximum, 23%, was between 30 to 34 years, followed by 17.7% in 35 to 39 years and 40 to 44 years (Table 1). Out of the total, 63.7% were female (Table 2) and 90.3% were married. Out of all interviewed 62.8% were literate (Table 3). Out of the 113, 52.2% were from the sex worker community while the remaining 47.8% were comprised of various employment backgrounds (Table 4).

Adherence

Based on the operational definition used in the study, only 42.5% of the sample was found compliant with ART treatment. Reasons put forward for non-compliance to ART include side effects of medicine, distance from residence to ART Centre (Table 5), lack of social support, fear to be identified as positive followed by possible social discrimination. A large percentage of ART recipients (22.1%) shared a difficulty in reaching the ART center as the major reason for not collecting medicines regularly. Cost of traveling expenses was identified as one of the prominent demotivating factors. Out of all participants, around 62.8% of them received some kind of support from their family members whereas the remaining 37.2% did not receive supports financially, material or any other social or moral support. Of those who took part in the study, the majority of those who are (71.4%) non-compliant to ART were between the ages of 18 – 24 followed by 35 – 39 year age group (70%). It was found that people from other occupational backgrounds were more (66.7%) non-compliant to their ART regimen when compared to sex workers (49.2%). Non-compliance to ART was found to be more prevalent among those who concealed their positive identity to their family members and or to their neighbors (Table 6).

Those who had symptoms related to side effects of the medicine were less compliant (67.1%) than those (37.8%) who had not suffered from any side effects (Table 7). Those who are active members of a positive people network are more compliant than others (Table 8). Those who do not receive family support are more (59.5%) non-compliant to ART (Table 9). It was also observed that 90% of participants, who have no adequate knowledge regarding consequences of discontinuation of medicine, are more non-compliant to medicine (Table 10) as opposed to those who had adequate knowledge of discontinuation (50.5%). Out of the 113 participants, it was revealed that those who pay more than Rs. 80/-per day as travel expenses is less non-compliant (64.3%) to ART in comparison to those who paid less or nominal sum of money to attend ART Centre (36.4%)(Table 11). Waiting period at the clinic was found to also influence ART adherence. Those who had to wait a shorter period of time (less than 30 minutes) at the ART Centre were more (58.8%) compliant to ART compared to those who had to wait longer than 30 minutes to collect medicine (37.5%).

The frequency of non-adherence was more prevalent among participants who are literate compared to those who are illiterate. It was encouraging to note that within the study population those who are members of positive peoples' network showed better compliance with antiretroviral drugs as compared to nonmembers.

Multivariate analysis was done taking into account five major determinants of adherence namely long waiting time at the service outlets, expenses related to travel, attitude and practices of the health care providers (Table 12), distance from residence to ART Centre (Table 13) and those who had suffered from side effects of the medicine.

While carrying out multivariate analysis it was observed that there is no single factor which has more contribution in influencing ART adherence over the others. So it could be concluded that the poor adherence to ART can be attributed to a combination of factors as mentioned above.

Discussion

The World Health Organization (WHO) recommends that accurate assessment of adherence is necessary for effective and efficient treatment planning viii,ix. Decisions to make a change in the treatment regimen, and to promote adherence depends on the valid and reliable measurement of adherence and reasons behind the failure to

adhere. Without formal assessment, providers are unlikely to assess and identify the level of adherence (and non-adherence) thereby missing the opportunity for reinforcement of the message and possible usage of constructive interventions. If adherence is below optimal levels blood levels of ART recipients would be low and HIV virus will continue to replicate. Our study showed that adherence among the ART recipients is as low as 48%. With this level of adherence, it is highly unlikely that the virus load will come down at a level that would help the improvement of health status and prevention of opportunistic infection among the ART recipients and will not make him/her noninfective. HIV is highly adaptive to viral-suppressing pressures and can rapidly mutate to develop resistance X, xii. In some cases, ART may still improve CD4 cell count despite ongoing viral replication due to development of mutant viruses which emerge less fit and less destructive than the wild-type of HIV strain xiii.

Complete viral suppression is defined as less than 40 HIV copies/ml of blood xiv. Failure to sustain complete viral suppression is a precursor for the development of HIV mutation followed by treatment failures leading to progression of the disease. Moreover, development of resistance against the first line of treatment reduces physician choices leaving behind only the more costly options to start with a second or third line of the ART treatment.

Transmission of HIV including the mutated strain through the exchange of body fluid will create major public health problems in addition to increasing the burden of heightened expenditure.

Studies have established that up to 95% adherence is necessary for HIV viral suppression xvi, xvii. Studies have linked the relationship between adherence and viral load (VL), as adherence decreased xviii VLs increase sharply in a dose-response effect and it is possible to conclude that greater adherence levels are associated with greater reduction in VLs xix, xx. Accurate and reliable measures of adherence and a better understanding of both barriers and facilitators of adherence are needed to help clinicians identify patients who need additional assistance with their pill taking, to design and evaluate effective interventions to enhance adherence, and to interpret the role of adherence in evaluating clinical outcomes and making treatment decisions, xxii. Our research shows that major barriers to ART adherence are long waiting time, distance from the house to ART Centre, the burden of traveling expense and fear of discrimination and behavior of staff at the ART centers.

In order to identify adherence-related issues and challenges (irrespective of which class of ART patients is on) and to develop appropriate interventions, adherence measurement is fundamental and tools need to be developed to assess adherence xxiii, xxiv, xxv. In India, at present there are more than 500,000 cases registered under ART having no mechanism in place for the systematic collection of data or analysis of ART uptake and adherence there is an urgent need to probe into these issues with an objective to find out possible gaps and challenges. Our findings suggest that reasons behind non-compliance to ART are many and multiple in nature as observed in other studies xxvi, xxvii. Various familial, social and structural factors affect regular intake of ART at the individual level. It is of paramount importance to address those underlying factors so as to improve the quality of life of positive people through influencing their ART adherence behavior and practices xxviii, xxix, xxx, xxxi.

4. Conclusion

It is assumed that multiple stakeholders at various levels influence ART adherence. Without undermining the role of service providers in improving ART adherence one needs to look into a gamut of socioeconomic and cultural factors as observed in our findings xxxii, xxxiii, xxxiv. In India, ARTs are made available and accessible to all those who need it and are provided free of cost. However poor compliance to ART is likely to diminish the effectiveness of any national program on care and treatment xxxv. The outcome of this study can help in designing a better framework of service delivery program to improve ART adherence, which in turn would help improve the quality of life for positive peoples while preventing the occurrence of a resistant strain. Ensuring adherence would also help prevention programs as the infected individuals who are receiving ART regularly will be noninfective and unable to transmit infection.

The efficacies of the current antiretroviral drugs are extremely good. Therefore, the most important factor for virological control depends on the high degree of adherence. From the public health point of view, the significance of transmission of HIV from the infected individual to others would be nil or significantly less, provided the infected individual adheres to ART. These could be a huge waste of national resources provided the objective of ART failed to bring about the desired outcome in the life of the individuals due to poor adherence leading to the development of a resistant strain. This would force the physician to prescribe more costly 'second' or 'third' lines of ART regimen.

The following recommendations have emerged from the study. There is a need to develop an effective mechanism to monitor ART adherence at each ART Centres followed by analysis and interpretation of data. This would help to provide requisite feedback to physician and to develop a system to improve adherence to ART. A

system should be in place to support of HIV positive patients by linking them with HIV support groups and networks. More social and clinical support services have to be organized closer to the residences of the positive HIV people. This could be made possible through routing delivery of services through community-based organizations and positive people networks. Early identification of side effects and a user-friendly system of management needs to be developed and delivered at the earliest opportunity. The ART centers should review their patient flow system and bring down the waiting time for patients who attend clinics.

ART adherence is a big challenge, there is no shortcut procedure to improve adherence among the ART recipients. It requires effective communication with the patients, aided with adequate social support, and encouragement to the positives. All other factors identified in the study linked stigma and discrimination. This has to be addressed through an introduction of a system for reporting cases of discrimination, followed by counseling and training of the service providers with provisions for compensation to those discriminated against.

Table 1
ART compliance among people of different age group

ART Compliance	Age Group								Total	
	18 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45	–	49		
	50 and above									
No	Count 5	8	10	14	12	9	7		65	
	% within age group (in years)				71.4	53.3	38.5		70.0	60.0
	63.6	57.5								64.3
Yes	Count 2	7	16	6	8	5	4		48	
	% within age group (in years)				28.6	46.7	61.5		30.0	40.0
	36.4	42.5								35.7
Total	Count 7	15	26	20	20	14	11		113	
	% within age group (in years)				100	100	100		100	100
	100									

Out of the 113 interviewees, the maximum (71.4%) non-compliant found was in the age group of 18 – 24 years followed by those in the age group of 35 – 39 years.

Table 2
ART compliance among genders

Gender	Compliant	Non-compliant
Male 11 (26.8%)	30 (73.2%)	
Female	37 (51.4%)	35 (48.6%)

Out of the 113 interviewees, it was found that males were more (73.2%) non-compliant to ART compared to females (48.6%)

Table 3
ART Compliance among people of different educational status

ART Compliance	Educational Status		Total	
	Illiterate	Literate		
No	Count 18	47	65	
	% within Educational status		42.9	66.2
				57.5
Yes	Count 24	24	48	
	% within Educational status		57.1	33.8
				42.5

Total Count	42	71	113		
% within Educational status	100	100	100		

Out of the 113 interviewees, it was found that educated individuals are more (66.2%) noncompliant to ART compared to illiterates (42.9%)

Table 4
ART compliance among people of different occupation

ART Compliance		Occupation		Total	
		All other occupation in combination Sex Worker			
No	Count 36	29	65		
	% within occupation		66.7	49.2	57.5
Yes	Count 18	30	48		
	% within occupation		33.3	50.8	42.5
Total	Count 54	59	113		
	% within occupation		100	100	100

Out of the 113 interviewees, it was found that people from all other occupation in combination are more (66.7%) non-compliant to ART compared to sex workers (49.2%)

Table 5
ART compliance among people who has difficulty in reaching the center

ART Compliance		Difficult to reach centre		Total	
		No	Yes		
No	Count 52	13	65		
	% within difficult to reach centre		59.1	52.0	57.5
Yes	Count 36	12	48		
	% within difficult to reach centre		40.9	48.0	42.5
Total	Count 88	25	113		
	% within difficult to reach centre		100	100	100

Out of the 113 interviewees, who find difficulty in reaching to the center are in fact less (52.0%) non-compliant to ART compared to those who do not find it difficult to reach to the ART Centre (59.1%)

Table 6
ART compliance among people whose neighbor knows the result

ART Compliance		Neighbor knows your positive status		Total	
		No	Yes		
No	Count 49	16	65		
	% within neighbor knows your positive status		57.6	57.1	57.5
Yes	Count 36	12	48		
	% within neighbor knows your positive status		42.4	42.9	42.5
Total	Count 85	28	113		
	% within neighbor knows your positive status		100	100	100

Out of the 113 interviewees, it was found that non-compliance was more than 50% whether their positive status was known to the neighbor or not

Table 7
ART Compliance among people who feels side effects to take medicine

ART Compliance	Feel any side effects to take medicine			Total	
	No	Yes			
No	Count 14	51	65		
	% who has not suffered from any side effects to take medicine			37.8	67.1
	57.5				
Yes	Count 23	25	48		
	% who has not suffered from any side effects to take medicine			62.2	32.9
	42.5				
Total	Count 37	76	113		
	% who has not suffered from any side effects to take medicine			100	100

Out of the 113 interviewees, it was found that those who had suffered from any side effects were more non-compliant (67.1%) to ART compared to 37.8% of them who were having no side effects

Table 8
ART compliance among people who are a member of various networks

ART Compliance	Member of				Total	
	None	Mamata Network	Krishnanagar Network	Ranaghat Network		
No	Count 14	32	10	9	65	
	% within member of				63.6	57.5
Yes	Count 8	29	2	9	48	
	% within member of				36.4	42.5
Total	Count 22	61	12	18	113	
	% within member of				100.0	100

Out of the 113 interviewees, it was found that those who were members of Ranaghat Network (50.0%) and Mamata Network (52.5%) were less non-compliant

Table 9
ART compliance among people who receive family support

ART Compliance	Receive family support			Total	
	No	Yes			
No	Count 25	40	65		
	% within receive family support			59.5	57.5
Yes	Count 17	31	48		
	% within receive family support			40.5	42.5
Total	Count 42	71	113		
	% within receive family support			100	100

Out of the 113 interviewees, it was found that those who do not receive family support were more (59.5%) non-compliant to ART compared to those who received support (56.3%)

Table 10
ART compliance among people who has knowledge about the effect of discontinuation of medicine

ART Compliance	Knowledge about the effect of discontinuation of medicine			Total	
	No	Yes			
No	Count 18	47	65		
	% has knowledge about effect of discontinuation of medicine			90.0	50.5
	57.5				
Yes	Count 2	46	48		
	% has knowledge about effect of discontinuation of medicine			10.0	49.5
	42.5				
Total	Count 20	93	113		
	% has knowledge about the effect of discontinuation of medicine			100	100
					100

Out of the 113 interviewees, it was found that those who had no knowledge about the effect of discontinuation of medicine were more (90.0%) non-compliant to ART compared to those who had knowledge about the effect of discontinuation (50.5%)

Table 11
ART compliance among people whose travel cost to reach ART Centre is expensive

ART Compliance	Travelling Expense			Total	
	No	Yes			
No	Count 4	9	13		
	% within Travelling Expense			36.4	52.0
Yes	Count 7	5	12		
	% within Travelling Expense			63.6	48.0
Total	Count 11	14	25		
	% within Travelling Expense			100	100

Out of the 113 interviewees, it was found that those whose traveling expense was more were more (64.3%) non-compliant to ART compared to those whose traveling expense was less (36.4%)

Table 12
ART compliance among people which depended on the behavior of health staff

ART Compliance	Behavior of health staff			Total	
	No	Yes			
No	Count 13		13		
	% within Behavior of health staff			54.2	52.0
Yes	Count 11	1	12		
	% within Behavior of health staff			45.8	100.0
Total	Count 24	1	25		
	% within Behavior of health			100	100

Out of the interviewees, it was found that behavior of staffs did not have any effect on compliance

Table 13
ART compliance among people whose house is far from ART Centre

ART Compliance	Far from the house		Total
	No	Yes	
No	Count 3	10	13
	% far from the house	42.9	55.6
Yes	Count 4	8	12
	% far from the house	57.1	44.4
Total	Count 7	18	25
	% far from the house	100	100

Out of the 113 interviewees, it was found that those whose house was further away from the ART Centre were more (55.6%) non-compliant to ART compared to those whose house was nearby (42.9%)

Conflict of interest statement and funding sources

The author(s) declared that (s)he/they have no competing interest. The study was financed by personal funding.

Statement of authorship

The author(s) have a responsibility for the conception and design of the study. The author(s) have approved the final article.

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